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THE PLANT DISEASE REPORTER

Issued By

Division of Mycology and Disease Survey

Volume XXII Number 13

July 15, 1938.

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE REPORTER

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THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

Vol. XXII Number 13

July 15, 1938

IN THIS ISSUE

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Onion downy mildew continues to spread in New York and specimens have been received from New Jersey, according to A. G. Newhall, who reports on some other diseases of onion also, page 277.

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A SURVEY OF COTTON SEEDLING DISEASES AND THE FUNGI ASSOCIATED WITH THEM

Paul R. Miller

The purpose of this survey was to obtain information regarding the prevalence and relative distribution of the various fungi associated with the damping-off of cotton seedlings, as well as to make comparative observations on the number and condition of diseased seedlings in fields planted with treated versus untreated seed.

Samples consisting of 25 to 50 seedlings gathered at random were sent to the laboratory at the South Carolina Agricultural Experiment Station, Clemson, South Carolina, where Dr. Arnold J. Ullstrup, of the Division of Cotton and Other Fiber Crops and Diseases, plated out all of the specimens and made the identifications of the fungi involved

Table 1 shows the number of samples sent in from each State and the individuals who cooperated in collecting the seedlings.

Table 1.

State	Number of samples	Collector
Virginia	18	P. R. Miller
North Carolina	14	P. R. Miller and H. D. Barker
South Carolina	147	J. F. Gilreath, C. C. Bennett, P. R. Miller, and others
Georgia	39	P. R. Miller, S. B. Fenne, and A. L. Smith
Alabama	24	P. R. Miller
Mississippi	46	L. E. Miles
Louisiana	13	D. C. Neal and H. D. Barker
Texas	4	H. D. Barker
Tennessee	39	P. R. Miller and H. D. Barker
Total	344	

The extent of the survey and the origin of seedling samples are indicated on the map (Fig. 1) which shows the number of samples obtained from different counties in each State.

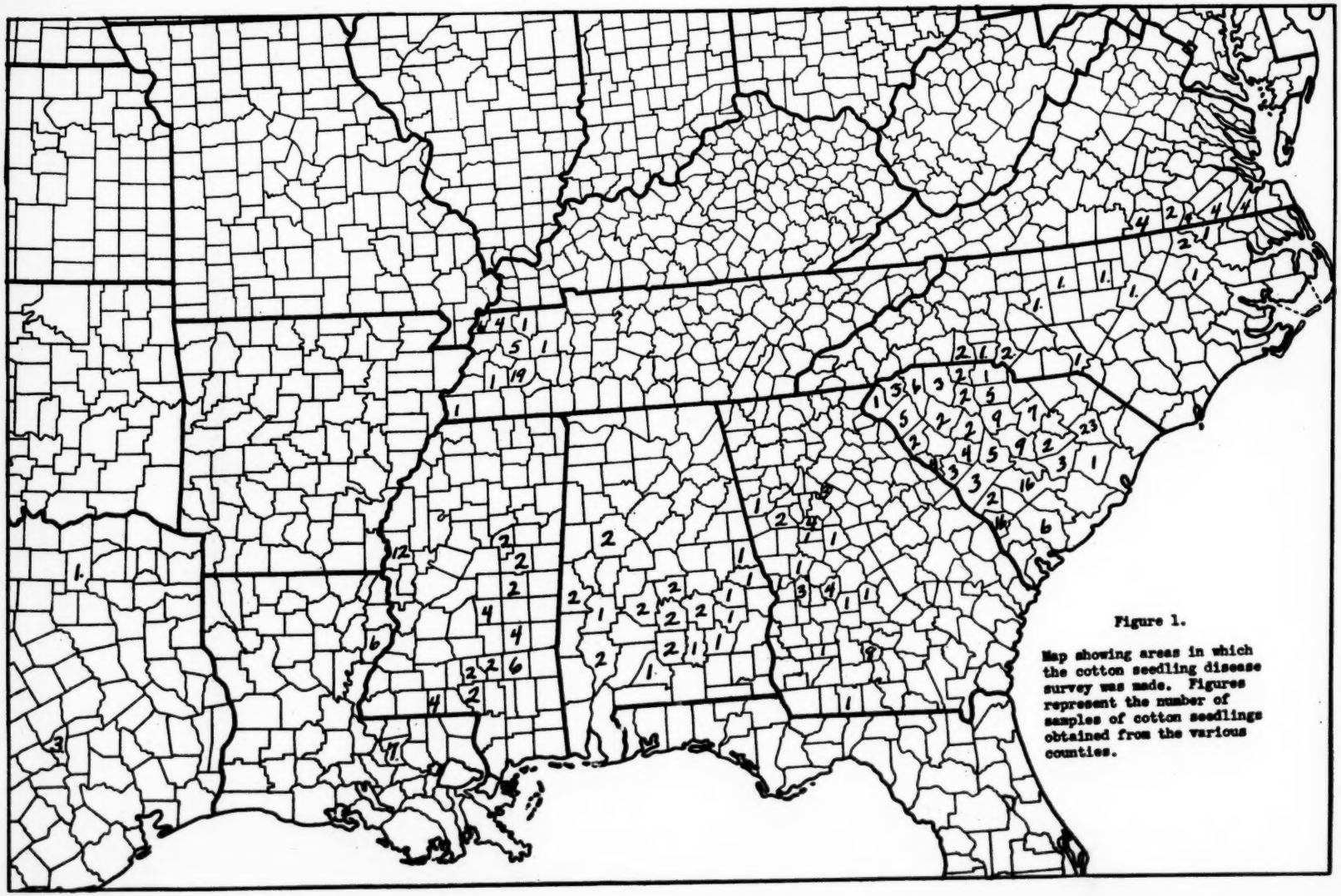

Figure 1.

Map showing areas in which the cotton seedling disease survey was made. Figures represent the number of samples of cotton seedlings obtained from the various counties.

The most striking feature of the results obtained from this survey was the prevalence of Glomerella gossypii in the samples[1/]. It will be seen in Tables 2 and 3 that this fungus was found on seedlings from all States included in the survey. It was predominant in samples from every

Table 2. Results of platings of cotton seedlings for 1938.

Origin of samples	Number of samples	Number of times various fungi recovered.									
		Glomerella gossypii	Fusarium moniliforme	Rhizoctonia solani	Fusarium spp.	Pythium spp.	Diplodia gossypii	Rhizoctonia bataticola	Fusarium vasinfectum	Sclerotium rolfsii	Aspergillus spp.
South Carolina	147	111	98	15	56	11	3	6	3	0	1
Georgia	39	39	37	4	17	0	2	2	0	0	0
Alabama	24	24	21	0	14	0	2	1	0	0	0
Mississippi	46	28	21	12	20	0	2	0	0	1	0
Tennessee	39	35	22	3	28	4	2	0	0	0	0
Louisiana	13	12	6	6	7	0	0	3	0	1	0
Texas	4	3	3	1	4	0	0	2	0	1	0
North Carolina	14	13	13	1	5	0	0	1	1	0	0
Virginia	18	18	18	2	10	0	0	0	0	0	0
Total	344	283	239	44	161	15	11	15	4	3	1

Table 3. Number of times the fungi indicated were isolated as the predominant organism in the culture plates.

Origin of samples	Glomerella gossypii	Fusarium moniliforme	Rhizoctonia solani	Others*	Total
South Carolina	98	4	4	41	147
Georgia	36	0	0	3	39
Alabama	24	0	0	0	24
Mississippi	23	1	4	18	46
Tennessee	24	3	0	12	39
Louisiana	7	1	2	3	13
Texas	1	1	1	1	4
North Carolina	13	0	0	1	14
Virginia	14	4	0	0	18
Total	240	14	11	79	344

* Includes Fusarium spp., Fusarium vasinfectum, Rhizoctonia bataticola, Pythium spp., Alternaria spp., Diplodia gossypii, and Sclerotium rolfsii.

[1/] In Dr. Ullstrup's complete notes of the results of plating out the fungi, from which portions of this report were prepared, he stressed the necessity of careful observation to detect the presence of G. gossypii when associated with F. moniliforme or other Fusarium spp., since its short conidiophores are easily obscured by the profuse growth of the fusaria.

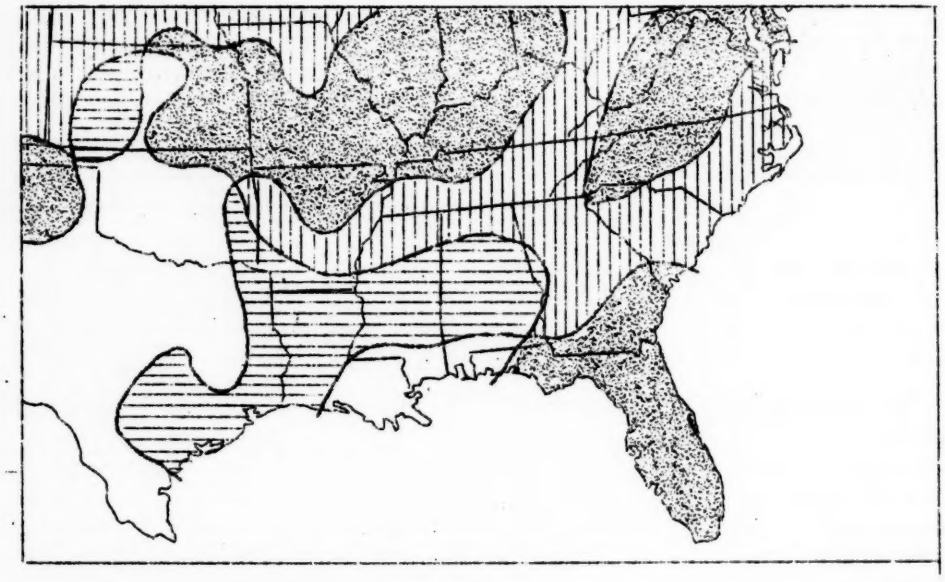

Fig. 2. Temperature and precipitation compared with normal for April 1938.

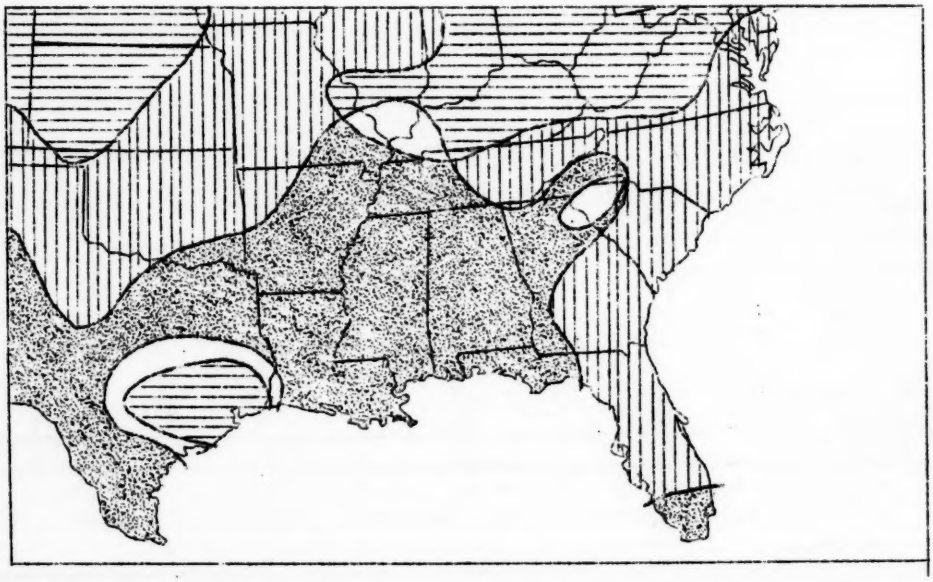

Fig. 3. Temperature and precipitation compared with normal for May 1938.

Precipitation and temperature both below normal.

Precipitation above, temperature below normal.

Precipitation below, temperature above normal.

Precipitation and temperature both above normal.

State except Texas. As shown in Table 2 it was isolated 283 times from a total of 344 samples whereas Fusarium moniliforme and Rhizoctonia solani were recovered 239 and 44 times respectively. Table 3 records G. gossypii as the most prevalent organism found on the culture plates, 240 times out of the total 344, whereas F. moniliforme and R. solani were found 14 and 11 times respectively.

A species of Pythium was predominant on a few samples originating in limited localities in two States, South Carolina and Tennessee. Previous to and during the time these particular seedlings were collected a period of cold, wet weather prevailed. R. solani apparently played a comparatively more important role as a seedling pathogen in Mississippi and Louisiana than in other States.

At the beginning of the survey the writer made an attempt to make counts of the percentage of seedlings showing lesions by pulling all of the plants from 10 one-foot rows selected at random. This method proved futile since practically all of the seedlings in the majority of fields planted with untreated seed showed lesions. However, where comparative counts could be made of the number of seedlings surviving and also of the severity of the lesions on seedlings from treated and from untreated seed, the differences were usually striking. The average of 50 such counts showed that 3 times as many plants survived where the seed had been treated as where it had not. Although lesions were frequently found on seedlings from treated seed they were usually restricted in area and superficial.

It is difficult to determine the various cotton seedling diseases in the field, on the basis of the different types of lesions. However, with considerable field experience there appears to be some reliability in field diagnosis, especially if the diseases are observed in certain stages of their development. As evidence of this statement, for this particular year, 90 percent of the writer's field diagnoses were verified by subsequent cultures.

It would be desirable to conduct this type of survey over a period of years during which different weather conditions prevail to determine whether Glomerella gossypii continues to be the predominating organism on diseased cotton seedlings. For a matter of record of the weather conditions this year, two maps (Figs. 2 and 3) showing the temperature and rainfall conditions for the period of time that this survey was conducted, are presented.

(Division of Mycology and Disease Survey. Chairman, Cotton Disease Survey Committee).

THE FUNGOUS FLORA OF THE PEAVY ARBORETUM

G. R. Hoerner[1]/

In 1932 Kimmey[2]/ made a pathological survey of the Peavy Arboretum, an area of forestland in Benton County, Oregon, owned by the Oregon State College and used by the School of Forestry for instructional and research purposes. As a part of this survey a list of forest fungi collected on the tract is presented.

In an effort to augment herbarium accessions of fungi from this area fifty additional specimens were collected over a period extending from July 9, 1933 to November 29, 1934. They are listed herewith for permanent record.

SPECIMEN INDEX

No.

1. Rhytisma arbuti Phill. on leaves of Arbutus menziesii Pursh. 3-11-34.
2. Puccinia holcina Erikss. II, III, on leaves of Holcus lanatus L. 11-25-33.
3. Clitocybe odora Fr. var. pacifica Kauffm. on duff of forest floor. 11-25-33; 11-29-34.
4. Helvella crispa Fr. on mineral soil. 11-25-33.
5. Stropharia ambigua (Pk.) Zeller on duff of forest floor. 11-25-33.
6. Armillaria mellea Fr. on mineral soil. 10-21-33.
7. Flammula alnicola Fr. on trunk of Alnus rubra Bongard. 10-7-33.
8. Polyporus fissus Berk. on branches of Quercus garryana Dougl. 9-23-33.
9. Lepiota naucina Fr. on mineral soil. 9-23-33.
10. Psalliota campestris Fr. on mineral soil. 9-23-33.
11. Geaster hygrometricus (Pers.) Morgan on duff of forest floor. 9-23-33; 11-29-34.
12. Rhytisma punctatum (Pers.) Fr. on leaves of Acer macrophyllum Pursh. 8-26-33.
13. Gnomonia coryli (Batsch. ex Fr.) Awd. on leaves of Corylus californica (A. DC) Rose. 7-9-33.
14. Puccinia koeleriae Arth., I, on leaves of Berberis aquifolium Pursh. 7-9-33.

1/Agent, United States Department of Agriculture, Bureau of Plant Industry, Division of Drug and Related Plants.

2/Thesis on a Pathological Survey of the Peavy Arboretum Submitted to the Oregon State Agricultural College in Partial Fulfillment of the Requirements for the Degree of Master of Science by James William Kimmey, May, 1932.

Part II. The Forest Fungi of the Peavy Arboreturn, pp. 17-48. p. 41-5, The Host Plants. The host plants are alphabetically arranged with the fungi, found on them, arranged alphabetically for each host.

15. Puccinia symphoricarpi Hark., III, on leaves of Symphoricarpos albus (L.) Blake. 7-9-33.
16. Xylaria hypoxylon (L.) Brev. on branches of Alnus rubra Bongard. 10-7-33.
17. Tremellodon gelatinosum Pers. on rotten wood. 11-25-33; 11-29-34.
18. Botrytis cinerea Pers. on stems of Maclura pomifera (Raf.) Schneider. 3-11-34.
19. Botrytis cinerea Pers. on seedlings of Pinus caribaea Morelet. 3-21-34.
20. Botrytis cinerea Pers. on seedlings of Pinus radiata D. Don. 3-21-34.
21. Claviceps purpurea (Fr.) Tul. on fruit of Elymus glaucus Buckl. 8-26-33.
22. Crucibulum vulgare Tul. on rotten wood. 9-23-33.
23. Botrytis cinerea Pers. on seedlings of Pinus halepensis Mill. 3-21-34.
24. Tricholoma amara (A. & S.) Quél. on duff of forest floor. 10-21-33.
25. Diplocarpon earliana (Ell. & Ev.) Wolf on leaves of Fragaria cuneifolia Nutt. 8-26-33.
26. Mycosphaerella gaultheriae (Cke. & Ell.) House on leaves of Gaultheria shallon Pursh. 7-9-33.
27. Helotium citrinum (Hedw.) Fr. on Quercus garryana Dougl. 10-21-33.
28. Hypholoma fasciculare (Huds.) Fr. on Quercus garryana Dougl. 11-29-34.
29. Polystictus versicolor (L.) Fr. on Acer macrophyllum Pursh. 10-7-33.
30. Tremella mesenterica Retz. on rotten wood. 9-23-33.
31. Puccinia pimpinellae Mart., II, III, on leaves of Washingtonia divaricata Britt. 8-26-33; 7-23-34.
32. Trametes subrosea Weir on Pseudotsuga taxifolia Britt. 11-9-34.
33. Fomes ferruginosus (Schrad.) Massee on Quercus garryana Dougl. 11-25-33.
34. Stereum hirsutum (Willd.) Fr. on Quercus garryana Dougl. 11-29-34.
35. Russula sp. on duff of forest floor. 10-7-33.
36. Spathularia flavida Pers. on duff of forest floor. 11-25-33; 11-29-34.
37. Fomes pinicola Fr. on Pseudotsuga taxifolia Britt. 11-29-34.
38. Erysiphe cichoracearum DC. on Galium triflorum Michx. 8-26-33.
39. Lenzites sepiaria Fr. on Pseudotsuga taxifolia Britt. 11-25-33.
40. Fomes applanatus (Pers.) Fr. on trunk of Quercus garryana Dougl. 8-26-33.
41. Marasmius plicatulus Pk. on duff of forest floor. 11-29-34.
42. Russula sp. on duff of forest floor. 10-7-33.
43. Gyrocephalus rufus (Jacq.) Bref. on duff of forest floor. 11-25-33; 11-29-34.
44. Hypholoma fasciculare (Huds.) Fr. on trunk of Acer macrophyllum Pursh. 10-7-33; 10-20-33.
45. Fomes applanatus (Pers.) Fr. on trunk of Pseudotsuga taxifolia Britt. 8-26-33.
46. Microsphaera symphoricarpi Howe on leaves of Symphoricarpos albus (L.) Blake. 8-26-33.
47. Gomphidius oregonensis Pk. on duff of forest floor. 10-21-33; 11-25-33; 11-29-34.
48. Hygrophorus eburneus Fr. on duff of forest floor. 11-25-33; 11-29-34.

49. Microsphaera alni (DC.) Wint. on leaves of Quercus garryana Dougl. 9-23-33.
50. Erysiphe polygoni DC. on Trifolium pratense L. 8-26-33.

SUBSTRATUM INDEX

* = Not reported by Kimmey

Acer macrophyllum Pursh
- *Hypholoma fasciculare (Huds.) Fr.
- *Polystictus versicolor (L.) Fr.
- Rhytisma punctatum (Pers.) Fr.

Alnus rubra Bongard
- *Flammula alnicola Fr.
- *Xylaria hypoxylon (L.) Grev.

Arbutus menziesii Pursh.
- Rhytisma arbuti Phill.

*Berberis aquifolium Pursh.
- *Puccinia koeleriae Arth.

Corylus californica (ADC.) Rose
- Gnomonia coryli (Batsch. ex Fr.) Awd.

Duff on forest floor
- *Clitocybe odora Fr. var. pacifica Kauffm.
- Geaster hygrometricus (Pers.) Morgan
- *Gomphidius oregonensis Pk.
- *Gyrocephalus rufus (Jacq.) Bref.
- *Hygrophorus eburneus Fr.
- *Marasmius plicatulus Pk.
- Russula sp.
- *Spathularia flavida Pers.
- Stropharia ambigua (Pk.) Zeller
- Tricholoma amara (A. & S.) Quel.

*Elymus glaucus Buckl.
- *Claviceps purpurea (Fr.) Tul.

*Fragaria cuneifolia Nutt.
- *Diplocarpon earliana (Ell. & Ev.) Wolf

*Galium trifolorum Michx.
- *Erysiphe cichoracearum DC

*Gaultheria shallon Pursh.
- *Mycosphaerella gaultheriae (Cke. & Ell.) House

*Holcus lanatus L.
- *Puccinia holcina Erikss.

*Maclura pomifera (Raf.) Schneider
- *Botrytis cinerea Pers.

Mineral soil
- *Armillaria mellea Fr.
- *Helvella crispa Fr.
- Lepiota naucina Fr.
- *Psalliota campestris Fr.

*Pinus caribaea Morelet
- *Botrytis cinerea Pers.

*Pinus halepensis Mill.
- *Botrytis cinerea Pers.

*Pinus radiata D. Don.
- *Botrytis cinerea Pers.

Pseudotsuga taxifolia Britt.
- Fomes applanatus (Pers.) Fr.
- Fomes pinicola Fr.
- Lenzites sepiaria Fr.
- Trametes subrosea Weir.

Quercus garryana Dougl.
- Fomes applanatus (Pers.) Fr.
- Fomes ferruginosus (Schrad.) Massee
- *Helotium citrinum (Hedw.) Fr.

Quercus garryana Dougl. (Continued)
*Hypholoma fasciculare (Huds.) Fr.
*Microsphaera alni (DC) Wint.
Polyporus fissus Berk.
*Stereum hirsutum (Willd.) Fr.

*Rotten Wood
*Crucibulum vulgare Tul.
*Tremella mesenterica Retz.
*Tremellodon gelatinosum Pers.

*Symphoricarpos albus (L.) Blake
*Microsphaera symphoricarpi Howe
*Puccinia symphoricarpi Hark.

*Trifolium pratense L.
*Erysiphe polygoni DC

*Washingtonia divaricata Britt.
*Puccinia pimpinellae Mart.

FUNGUS INDEX

* = Not reported by Kimmey

Armillaria mellea Fr.
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*Clitocybe odora Fr. var. pacifica Kauffm.
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Trametes subrosea Weir
*Tremella mesenterica Retz.
*Tremellodon gelatinosum Pers.
Tricholoma umara (A. & S.) Quel.
*Xylaria hypoxylon (L.) Grev.

X-VIRUS DISEASE ON PEACHES IN NEW YORK

E. M. Hildebrand and D. H. Palmiter

On June 24, 1938 the new X-disease of peaches which has been causing concern in Connecticut[1] for the past five years, was identified in an orchard in Columbia County, New York. From an original planting of over 600 trees there now remain about 120 trees of which 27 or 22.5 percent are diseased - 6 severely, 7 moderately, and 14 slightly. A hedge row containing diseased choke cherries (Prunus virginiana L.) was present on two sides of the field and a railroad track on a third side.

On this date a heavy drop of shot-hole leaves, progressing from the base toward the tips of the shoots, had occurred in the peaches. The affected leaves remaining on the trees showed symptom development in progress ranging from water-soaked spots to reddish spots and shot-hole. Jarring the branches caused more leaves to fall. Similar symptoms were observed on choke cherry except for no leaf fall and in addition some otherwise normal appearing leaves were beginning to turn several shades of yellow and red.

While many of the peach trees removed from this orchard during the last few years were known to be suffering from the severe cold injury of 1933-1934, it is strongly suspected that considerable of the loss was due to the X-disease, since a diseased condition has been observed to be present in the orchard for at least three years.

(New York (Cornell) and New York State (Geneva) Agricultural Experiment Stations).

PHYTOPHTHORA ROT OF APPLE FRUIT

H. W. Anderson

In the University orchard at Urbana, phytophthora rot of apple fruit was noticed on July 2. The infected fruit was mainly on the Grimes variety and mostly within a foot of the ground, although several were found at the 18- to 20-inch level. Varieties other than Grimes were not bearing heavily, which might account for the more abundant infection on this variety. It is of interest to note, however, that Grimes collar

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1/Stoddard, E. M. Progress report of investigations on a new peach trouble. Proc. Conn. Pom. Soc. 43 (1933): 115-117. 1934, 44 (1934): 31-36. 1935, 45 (1935): 25-27. 1936.

rot, which Baines associates with Phytophthora cactorum[1/], is prevalent in this orchard. The loss of fruit is not serious, since it is confined to the lower limbs. From a few to over a hundred apples per tree were infected. Many had recently dropped.

After the prebloom and calyx sprays for scab, this orchard was divided into 4 plots receiving 2 treatments, one consisting of BL155 (nicotine) and oil, the other lead arsenate with a weak Bordeaux (3/4-1-100) as a corrective for arsenical injury. Practically all the rotted apples were in the nicotine plots. The amount of fruit infected was not sufficient to justify collecting exact data, but, since only 3 or 4 rotted apples were found in the lead arsenate-Bordeaux plots (about 50 trees), it seems reasonably certain that the weak Bordeaux or lead arsenate held the disease in check.

Very heavy rains during the latter part of May and in June probably accounts for this unusual infection. The disease seems to originate at the stem end in most cases. The stem end cavity is an ideal place for infection, since water splashing onto the apple would be retained in this cavity.

The Phytophthora was not identified as to species, but it is assumed to be Phytophthora cactorum, which is reported by Baines as common on fallen fruit in Indiana.

(University of Illinois).

STRAWBERRY DWARF SITUATION ON CAPE COD

O. C. Boyd

In Massachusetts this nematode disease [Aphelenchoides fragariae], with a single known exception, is confined to Cape Cod or Barnstable County. Even there, as a rule it has been irregular in distribution and amount of injury. Usually, a majority of the beds are not affected, but in some seasons losses on certain farms amount to 50 percent or more. The following account of dwarf in 1938 is made possible from several reports by County Agent Bertram Tomlinson who keeps in close touch with the strawberry situation each year on Cape Cod.

On May 12, Mr. Tomlinson surveyed beds in the Falmouth area and found dwarf in about half of the plantings including the varieties Fairfax, Dorset, and Howard-17. Symptoms at that time were more pronounced

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1/Baines, R. C. Phytophthora trunk canker of apple. (Abst.) Phytopath. 28: 2. Jan. 1938.

generally than in the past 3 years or in the average season. On May 25, in company with J. R. Christie and H. F. Bergman of the U. S. Department of Agriculture, he revisited beds of the same section. At that time it was possible to ascertain the probable effect of the disease on blossoming and on set of fruit. He estimated that at least 50 percent of the beds were diseased, that in the worst cases from 80 to 90 percent of the plants showed symptoms, and that reductions in yield of the 2 most severely injured plantings might reach 50 percent or more.

In reporting further on June 27, Mr. Tomlinson stated that "The most serious case up there this spring involved a grower who reported losing at least 150 crates which would be a loss of about 75 percent for that particular farm." In the majority of the more heavily infested beds, however, he felt that the losses ranged from 25 to 40 percent. For the town of Falmouth as a whole (where most of the crop is grown), his estimate is a crop loss of less than 1 percent.

In past years there has been ample evidence that the sources of this spring dwarf disease include both home-grown and Maryland-grown plants. For years, it has been the general practice of Cape Cod growers to purchase by far the majority of the plants for their so-called nursery-beds or mother-beds from Maryland. It is well known that on the Cape the dwarf nematodes remain comparatively inactive in the first year beds throughout the late spring, summer, and fall, but readily survive the winter in infested plants, and then appear in enormous numbers the following spring as new growth is taking place. Most of the injury occurs during the latter period; rarely any after early bloom.

Mr. Tomlinson reported observing this year on May 25 one new bed set from Maryland plants that showed an occasional plant with definite symptoms of dwarf. These few plants were later found by Dr. Christie to be infested with the dwarf nematode. As a rule, there is little if any evidence of the disease in the new beds, whether the plants are from diseased Cape Cod beds or from southern nurseries.

Observations and reports to date on the spring dwarf situations on Cape Cod and in Maryland and nearby States indicate that although the disease occurs in those southern areas it apparently does not develop there in the spring to the extent that it does normally on Cape Cod. A problem arising from this situation, which may be of commercial importance and which seems to be disturbing County Agent Tomlinson and his strawberry growers, is the possibility year after year of introducing diseased plants for their so-called nursery-beds or mother-beds from southern areas where the disease appears to be either absent from or of little importance in the nurseries.

Mr. Tomlinson estimates that around one million plants are purchased from Maryland nurseries each year by the growers in Falmouth. At

present, they are rather concerned about the danger involved in that source of plants, and are talking strongly in favor of switching hereafter to nurseries in northern areas in order to escape one source of dwarf. It is not known whether the dwarf nematode normally attacks plants on Cape Cod other than the cultivated strawberry, or whether it is able to persist in the soil from the end of one crop (early July) to the following spring when new beds are commonly started on the same land. Until those questions in the life history and habits of the organism are determined, it is impossible to know just how important the matter of crop rotation might be in the control of dwarf. Observations of certain instances in past years on the Cape indicate, however, a probable benefit from growing other crops on infested land for at least 1-1/2 years before resetting to strawberry plants.

(July 8. Extension Plant Pathologist, Massachusetts State College).

A DISEASE RESEMBLING FIRE-BLIGHT ON BLACK RASPBERRY IN PENNSYLVANIA

George L. Zundel

On Wednesday, June 29, I was in Berks County inspecting raspberry fields for disease. In the Cumberland black raspberry patch of George Follweiler, Kempton, R.D., I found that a large number of the tips of the new canes were blighted. An examination of these blighted twigs revealed the fact that the interior tissues were water-soaked with bacteria. The first visible symptom was a wilting of the tip of the cane. Later the young leaves at the tip showed a blackening, mostly in the veins. This blackening progressed down the cane and up the petioles of the leaves and into the veins. The final result was that the tip of the cane for 8 to 12 inches was killed. Further examination showed that the bacteria were still going down the cane. This condition is provisionally referred to as being fire blight on raspberries. It was noted when a plant was attacked that in nearly every case, 100 percent of the young twigs were blighted. The blight was most severe in portions of the plant very near to some blighted apple trees.

(Pennsylvania State College, Division of Agricultural Extension).

BACTERIAL GUMMOSIS ON SWEET CHERRY IN NEW YORK

D. H. Palmiter.

Bacterial-gummosis cankers [Bacterium cerasi] were found this spring in Dutchess and Ulster Counties, New York, causing serious damage to young plantings of sweet cherries. The 2 varieties showing most of the injury are Giant and Black Tartarian, while Windsor and Lambert trees in the same plantings appear to be free of the disease. In some plantings at least a third of the trees of susceptible varieties have been killed or show typical cankers. This disease, which has been serious in sweet cherry plantings of the Pacific coast for many years, has not been reported from New York before.

(New York State (Geneva) Agricultural Experiment Station).

LOSSES CAUSED BY POTATO DISEASES IN THE HASTINGS SECTION, FLORIDA, IN 1938

A. H. Eddins

Certain certified stocks of Spaulding Rose and Katahdin seed potatoes from New Brunswick, Canada, and Maine were found to contain tubers affected with bacterial wilt and soft rot, when examined at Hastings in December, 1937, while many stocks were free of the disease. These affected lots usually contained only a trace and only one lot contained as much as 1 percent diseased tubers. In three of five non-certified lots of Spaulding Rose examined, tuber infection was 4 percent in one, 2 percent in another, and a trace in the third. The certified and non-certified stocks of the Katahdin variety were freer of this disease than the Spaulding Rose. The losses at Hastings from bacterial wilt and soft rot were reduced from 5 percent in 1937 to 1 percent in 1938, chiefly because the Maine and Canadian certification officials rejected the worst affected fields for certification. The loss in 1938 was due mostly to planting non-certified, affected seed.

Net-necrosis was present in several stocks of Spaulding Rose and some of the most severely affected were not planted after arrival at Hastings but were sold for table stock. Wherever seed affected with net-necrosis was planted, leafroll plants were produced, the maximum percentage infection being 84 percent. The Katahdin did not show symptoms of the net-necrosis type of leafroll.

A good many of the certified and non-certified stocks of Spaulding Rose carried rugose mosaic, infection varying from a trace to 51 percent in fields planted with different lots of certified seed, and from 25

Table 1. Relation of the mean temperatures and rainfall for the January-February and March-April periods to losses caused by potato diseases in the Hastings Section, Florida, from 1932 to 1938.

Year	1932		1933		1934		1935	
	Jan.-Feb.	Mar.-Apr.	Jan.-Feb.	Mar.-Apr.	Jan.-Feb.	Mar.-Apr.	Jan.-Feb.	Mar.-Apr.
Weather: Mean Temperature-°F.	65.6**	62.9*	61.6	64.5	57.7*	64.5	57.9*	69.6**
Rainfall-Inches	2.25*	6.25	4.90	10.07**	6.07	8.76**	3.67*	2.50*
Disease	**Loss in Percent**							
Late Blight	2.0		15.0		8.0		0.0	
Rhizoctonia	2.0		4.0		5.0		4.0	
Brown Rot	1.5		2.0		3.0		8.0	
Early Blight	0.5		T[a]		0.5		T	
Common Scab	0.5		0.5		0.5		0.5	
Sclerotinia Rot	...[b]		T		0.5		T	
Southern Wilt	0.5		0.5		0.5		0.5	
Blackleg	...		0.5		0.5		0.5	
Fusarium Seed Piece Rot	...		...		T		T	
Mosaic and Virus	1.5		1.0		1.0		1.0	
Rugose Mosaic	...		...		...		...	
Leafroll	...		...		...		...	
Bacterial Wilt and Soft Rot	...		...		...		...	
Water Rot or Lenticel Rot	...		...		...		...	
Hair Sprout	...		...		...		...	
TOTAL	8.5		23.5		19.5		14.5	

Year	1936		1937		1938		Average 1932-1938	
	Jan.-Feb.	Mar.-Apr.	Jan.-Feb.	Mar.-Apr.	Jan.-Feb.	Mar.-Apr.	Jan.-Feb.	Mar.-Apr.
Weather: Mean Temperature-°F.	55.8*	65.9	64.0**	65.3	59.2	67.5**	60.3	65.7
Rainfall-Inches	13.75**	3.27*	6.32	10.24**	3.17*	3.02*	5.75	6.30
Disease	**Loss in Percent**							
Late Blight	4.0		15.0		2.0		6.6	
Rhizoctonia	3.0		2.0		2.0		3.1	
Brown Rot	2.0		1.0		3.0		2.9	
Early Blight	T		T		T		0.1	
Common Scab	0.5		0.5		1.0		0.6	
Sclerotinia Rot	T		T		T		T	
Southern Wilt	T		T		1.0		0.4	
Blackleg	2.0		4.0		0.5		1.1	
Fusarium Seed Piece Rot	0.5		T		T		T	
Mosaic and Virus	1.0		1.0		...			
Rugose Mosaic	...		...		4.0		1.8	
Leafroll	...		...		2.0			
Bacterial Wilt and Soft Rot	...		5.0		1.0		0.9	
Water Rot or Lenticel Rot	...		2.0		T		0.3	
Hair Sprout	...		...		T		T	
TOTAL	13.0		30.5		16.5		18.0	

* Temperature 3.4° F., or more below average; rainfall 2.08 inches or more below average.

** Temperature exceeds average by 1.8° F. or more. Rainfall exceeds average by 2.46 inches or more.

[a] Trace; less than 1 percent.

[b] None observed.

percent to 74 percent in fields planted with non-certified stocks. Maximum losses from rugose mosaic occurred where the potato plants were killed to the ground by a freeze in late January, since the mosaic plants did not possess sufficient vigor to make much growth after the freeze.

The production of a potato crop reasonably free of disease is determined not only by absence of disease in the seed stock but also by control measures used in combating diseases and the absence of weather conditions which favor development of different diseases. A description of the weather conditions at Hastings during the four-months growing period and losses caused by diseases for seven years are given in Table 1.

The season of 1938 was too dry to favor diseases affecting the tops of potato plants; consequently, there was less late blight [Phytophthora infestans] and early blight [Alternaria solani] than in an average year. The hot, dry season, however, was favorable for brown rot [Bacterium solanacearum], and if most of the severely infested land had not been planted with the brown rot resistant variety, Katahdin, maximum losses approaching those of 1935 would have resulted.

The weather conditions were favorable for common scab [Actinomyces scabies] in 1938 and the loss was double that reported for any of the six preceding years. These same conditions also caused southern wilt [Sclerotium rolfsii] to become more prevalent than usual, but reduced losses attributed to Sclerotinia rot [S. sclerotiorum], blackleg [Bacillus phytophthorus], water rot [B. carotovorus], Fusarium seed piece rot, and Rhizoctonia [R. solani].

One carload of seed of the California White Rose variety used in planting 50 acres produced 23 percent hair sprout plants, but the loss for the whole section amounted to only a trace since this was the only seed affected.

As shown in Table 1, the losses from potato diseases apparently are determined more by the condition of the weather during the last half of the growing period (March-April) than during the first half (January-February). The greatest losses occurred in 1933, 1934, and 1937 when the total rainfall for the March-April period was 8.76 inches or greater and exceeded the seven-year average for this period by 2.46 inches or more. Losses were below average in seasons when the rainfall was below average in March and April. In 1936 the losses were below average even though the rainfall, 13.75 inches, was excessive in January and February; the diseases apparently were held in check by the dry weather in March and April. Late blight caused maximum losses in 1933, 1934, and 1937 when the rainfall was excessive in March and April, and no damage in the hot, dry season of 1935. However, the weather in 1935 favored brown rot which caused a loss of 8 percent.

(Florida Agricultural Experiment Station).

A NEW BIOLOGIC FORM OF POWDERY MILDEW ON MUSKMELONS IN THE IMPERIAL VALLEY OF CALIFORNIA

I. C. Jagger[1/], T. W. Whitaker[2/], and D. R. Porter[3/]

In 1925 powdery mildew (Erysiphe cichoracearum D. C.) suddenly appeared on muskmelons in the Imperial Valley of California, and has caused serious injury to the crop since that time. In 1928 plants were found in mixed varieties from India which were highly resistant, usually being entirely free from mildew under Imperial Valley conditions, but occasionally showing rare, inconspicuous spots of mildew on the leaves. By crossing and backcrossing the leading commercial variety, Hale Best, with one of these resistant strains, a variety similar to Hale Best, but carrying the resistance of the melons from India, was developed. This was introduced in 1932 under the name Powdery Mildew Resistant Cantaloupe No. 50. This strain proved to have certain drawbacks but was grown commercially to a limited extent for a few years. Finally, further selection from No. 50 gave a much improved strain which was introduced in 1935 under the name Powdery Mildew Resistant Cantaloupe No. 45. This strain proved to be superior to previously grown varieties in several respects, in addition to being practically free from mildew. It came rapidly into commercial use, and was the principal variety in Imperial Valley in 1937 and 1938.

Until 1938 all plantings of No. 50 and No. 45 were practically free from mildew, occasionally showing, at most, rare, inconspicuous spots on the leaves. Early in the season of 1938 mildew was severe on all non-resistant varieties, but no mildew was noted on the No. 45 variety. In midseason, however, considerable recently developed mildew was observed in a few fields of No. 45 variety. During the remainder of the season mildew continued to develop on the No. 45 variety, apparently spreading out from the fields first noted until nearly all fields of the No. 45 variety showed from a little to considerable

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mildew. Mildew attacked similarly several pure line selections of No. 45 variety in breeding plots, eliminating the possibility that the mildew in field plantings of the No. 45 variety might be due to mixing or crossing with non-resistant varieties.

The development and spread of the disease in the fields suggested that a new biologic form of mildew had appeared on Powdery Mildew Resistant No. 45 variety. Parallel inoculations were made using, on the one hand, mildew from the rather severely mildewed No. 45 variety, and on the other hand, mildew from a severely mildewed plot of a non-resistant variety in a field where the surrounding No. 45 variety appeared to be free from mildew. In three carefully checked trials on excised leaves floated on 10 percent sucrose solution in Petri dishes the old form of mildew, or form No. 1, collected from the non-resistant variety, did not develop on leaves of the No. 45 variety, although it developed abundantly on check leaves of non-resistant varieties. The new form of mildew, or form No. 2, which was collected from the No. 45 variety, developed equally abundantly on leaves of the No. 45 variety, and on leaves of non-resistant varieties. Similar inoculations of seedlings in flats produced heavy infection on leaves, stems and cotyledon leaves, which confirm the results obtained with excised leaves.

It seems certain that a new form of powdery mildew (Erysiphe cichoracearum D.C.) has appeared on the No. 45 variety in Imperial Valley. In 1938 there was considerable mildew in many fields of the No. 45 variety, but in marked contrast to the non-resistant varieties there was little or no defoliation of the No. 45 variety and little, if any, commercial loss. This gives some grounds for hoping that the No. 45 variety is somewhat resistant to the No. 2 form of mildew and that it may escape the serious injury which the non-resistant varieties suffer. However, in 1938 mildew appeared on the No. 45 variety considerably later in the season than on the non-resistant varieties, and the No. 45 variety might have been equally injured if it had been attacked at the same time.

In the rather extensive stocks of Cucumis melo L. grown in connection with breeding for mildew resistance, there were a few strains in the 1938 Imperial Valley field plots which seemed highly resistant to both forms of mildew. This needs to be confirmed by further tests for resistance to the No. 2 form of mildew.

DOWNY MILDEW AND OTHER DISEASES OF ONION IN NEW YORK

A. G. Newhall

(From Weekly News Letter for dates indicated).

(July 5). The first specimen of onion affected with mildew (Peronospora destructor) was sent in by D. L. Hayes, June 22 from somewhere in Madison County. Just a week later C. C. Davis sent in similar specimens from Orange County where he said it was showing up in the same locality where it appeared last year. This early appearance of mildew on the commercial crop again this year does not enhance the otherwise fine prospects for a bumper late crop.

A hasty survey in Orange County June 23 found onions looking fine but more than a trace, perhaps up to 1 percent in some fields, of botrytis rot, particularly in fields of set onions. Pink root (Phoma terrestris) was observed to be very destructive in part of one field where onion refuse-infected soil had been spread. Loss of an acre or two is expected.

(July 11). A rapid survey of onion fields from Canastota to Elba last week revealed the presence of mildew in all the principal districts of Madison, Oswego, Wayne, Genesee, and Orleans Counties. Specimens have already been received from Orange County and from New Jersey where it is not very common. The disease has been present in the center of the Canastota area since early June and has spread rapidly in all directions. Losses to crops of seed will probably be heavy. In all counties visited it was much more prevalent on early set onions and in many places could not be found yet on the late seeded crop. This year's experience again offers striking evidence of the wisdom of not growing any set onions in districts where their main crop is grown from seed. The results of our topset and multipliers eradication as carried out in parts of Wayne and Oswego Counties will doubtless be revealed in the next three weeks. So far the prospect of success looks all right.

(New York (Cornell) Agricultural Experiment Station).

NOTES ON PLANT DISEASES IN NEW YORK

(From Weekly News Letter for dates indicated).

POTATO LATE BLIGHT: Conditions are believed to have checked the rate of development and spread of late blight [Phytophthora infestans] on potatoes on Long Island. The disease however, is well established on many farms and deserves respectful consideration so long as heavy dews occur. (H. C. Huckett, July 11).

In Orange County late blight has been showing up on black dirt potatoes in spite of intensive dusting. Chippewas seem to be most affected. (C. C. Davis, July 5).

BACTERIAL WILT OF SWEET CORN: In Nassau County wilt [Aplanobacter stewarti] is rather severe in some early corn. (O. S. Cannon, July 5).

In Orange County growers who did not use hybrid sweet-corn seed are reporting considerable wilt. (C. C. Davis, July 5).

Sweet-corn wilt is present in most fields in Ulster County where wilt-susceptible varieties were planted. It is not very severe at present. (C. G. Small, July 11).

JUNE WEATHER

(From the Weekly Weather and Crop Bulletin for the week ending July 5).

Figure 1 shows that mean temperatures for June 1938 were generally below the normal in the Ohio and central Mississippi Valleys and the Southeast, as well as in portions of the upper Lake region and along the Pacific coast. In the first-named area temperatures ranged from slightly below normal to as much as 3° below, while in the other sections they were only slightly below the seasonal average. Temperatures were unusually high in most areas from the western Great Plains northwestward, with departures being particularly marked in portions of the central Rocky Mountain area and the interior of the Pacific Northwest. Somewhat warmer weather was also noted in the Northeast, the departures ranging from 2° to 3° above normal.

Precipitation for June was very spotted (Fig. 2). In the Atlantic Coast States wide variations in rainfall occurred, with the percentage of normal for the month varying from 38 to over 300 percent. Abnormally heavy amounts were noted in the middle Atlantic coast and locally elsewhere, but at the same time subnormal rainfall was reported from portions of Maryland, Pennsylvania, northern New York, and local areas elsewhere. Most of the Great Plains had subnormal rainfall, as well as portions of the Lake region, the Ohio Valley, the lower Mississippi Valley, and adjacent central and west Gulf sections. Abnormally heavy precipitation was noted in the northwestern Ohio Valley, and from thence southwestward amounts were generally above the seasonal average. Unusually heavy falls for the season occurred in portions of New Mexico and Arizona, as well as in the western Great Basin. Most Pacific coast sections were quite dry, although above-normal amounts were noted in the interior valleys of Washington.

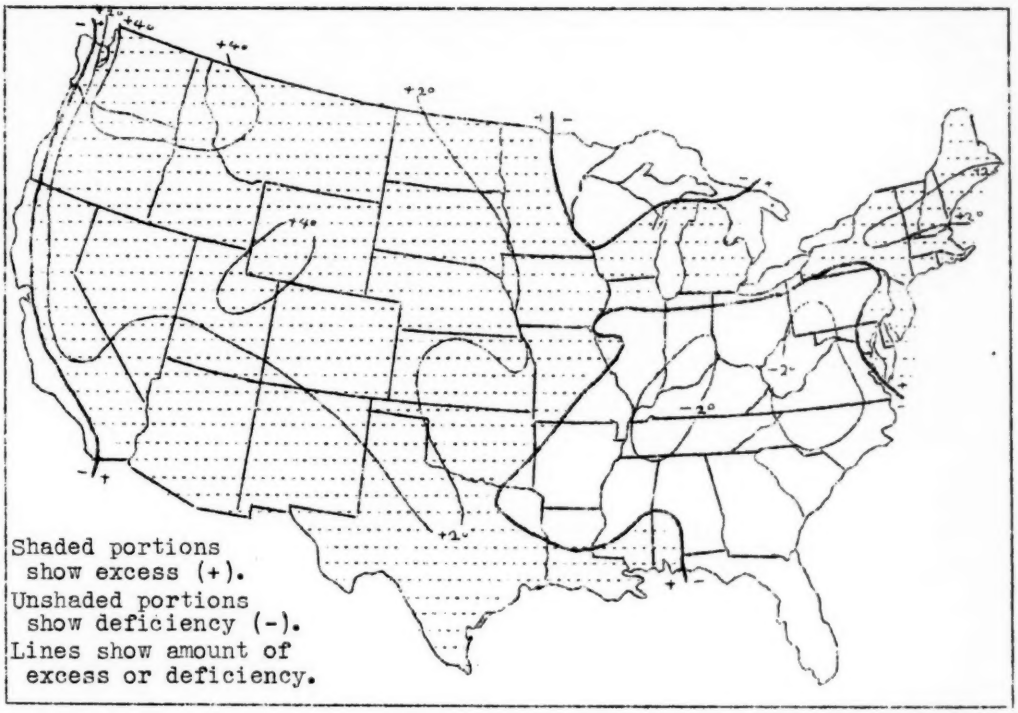

Fig. 1. Departure of Mean Temperature from the Normal for June 1938.

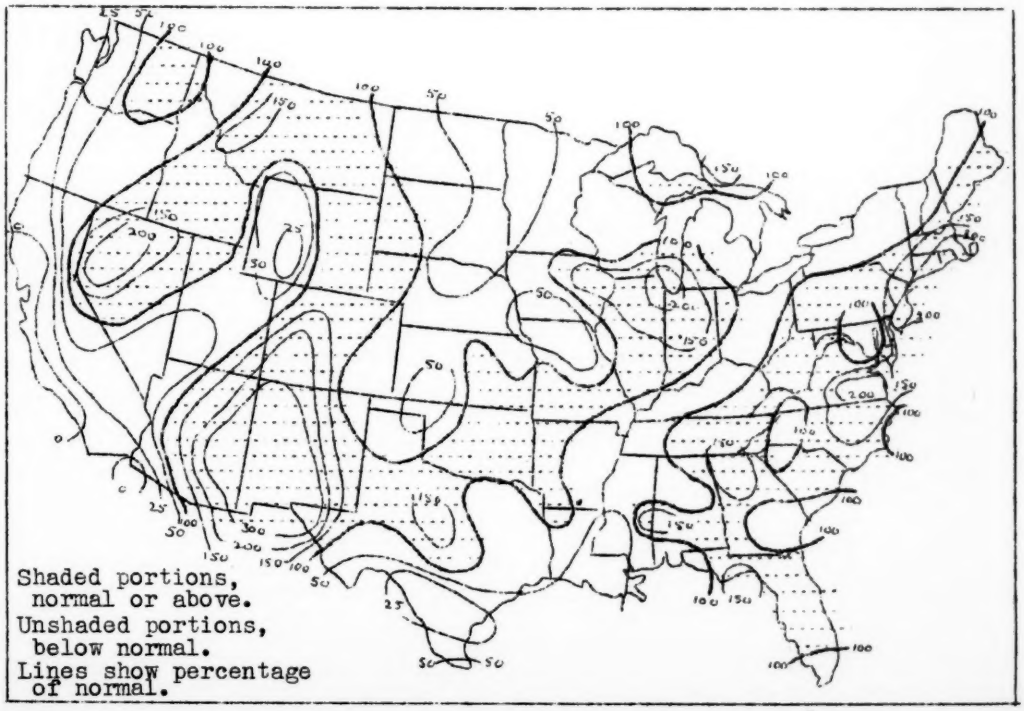

Fig. 2. Percentage of Normal Precipitation for June 1938.